

Arguments

REMARKS

This responds to the Office Action mailed on March 29, 2004.

Claims 1, 3, 4, 5, 7, 9-11, 13-14, 16-17 and 27 are amended. Claims 28 - 43 are added.

Claims 19, 21, 22, 24-26 have been canceled without prejudice. Accordingly, claims 1, 3-5, 7, 9-17, 27-43 are now pending in this application.

Amendments to Claims 1, 11, 27

Claims 1, 3, 4, 5, 7, 9-11, 13-14, 16-17, and 27 have been amended. No new matter has been introduced.

The amendments to the claims are made to satisfy Applicants' preferences, not necessarily to satisfy any legal requirement(s) of the patent laws, and they are not intended to limit the scope of equivalents to which any claim element may be entitled.

In claim 1, "and" has been added, "a" has replaced "the", "connection between" has replaced "connecting", and "and" has replaced "to".

In claim 3, "a" has replaced "the"; and "connection" has been added.

In claim 4, "a" has replaced "the".

In claim 5, "includes" has replaced "is".

In claim 7, "plurality of" has been added.

In claims 9, 10, and 14 "a" has replaced "the" in at least one instance.

In claim 11, "wherein the solder bumps are plastically deformed," has been added. Support for this amendment may be found, for example, on page 10, lines 6-7. The phrase "electrically coupled to" has replaced "located on"; and "a soldered joint connection between each of" has been added. Support for this amendment may be found, for example, in previously presented claim 1. The phrase "and a" has replaced "connected to the"; "one" has replaced "ones"; and "by soldered joints electrically coupling the die to the substrate" has been deleted.

In claim 13, "each of the soldered joint connections" replaced "the soldered joint"; and "the" was deleted.

In claim 16, "each solder bump" has replaced "the soldered joints each comprise solder on the die which"; "the respective" has replaced "a"; and "connection" has been added.

In claim 17, "joint" has been added; and "thereon" has been deleted.

In claim 27, “and” and “,” have been deleted; “each” and “; and” have been added. The phrase “a soldered joint connection between each of the plurality of reflowed solder bumps of the die and respective ones of the plurality of standoff contact members of the substrate” has replaced “the die capable of being coupled to the substrate with the solder bumps connected to the respective ones of the standoff contact members by soldered joints electrically coupling the die to the substrate”.

New Independent Claim and Dependent Claims

New independent claim 39, and dependent claims 28-38 and 40-43 have been added to provide Applicants with additional protection to which Applicants are entitled. New independent claim 39, and dependent claims 28-38 and 40-43 are supported by the original disclosure. No new matter has been introduced.

Support for the “stress-relieving element to absorb stress” recited in claims 28, 32, 35, and 41 may be found, for example, on page 10, lines 5-7 of Applicants’ original disclosure.

Support for the “solder reflow finish” recited in claims 29, 33, 36, and 42 may be found, for example, on page 7, lines 17-18 of Applicants’ original disclosure.

Support for the “solder bump is plastically deformed” recited in claim 30 may be found, for example, on page 10, lines 5-7 of Applicants’ original disclosure.

Support for the solder die bump(s) comprising “at least one of lead, silver and tin” recited in claims 31, 34, 37, and 43 may be found, for example, on page 9, line 5 of Applicants’ original disclosure.

Support for the “inelastically deformed” solder bump recited in claims 38 and 40 may be found, for example, on page 6, lines 14-15 of Applicants’ original disclosure.

Support for the “die with multiple reflowed solder die bumps at a temperature above a melting temperature of solder of the multiple reflowed solder die bumps; a substrate with multiple contact members at a temperature substantially lower than the temperature of the die, wherein the multiple contact members on the substrate have a melting temperature higher than the melting temperature of the solder, wherein the multiple contact members correspond to respective multiple reflowed solder die bumps, wherein the solder die bumps have a relatively lower yield strength” recited in independent claim 39 may be found, for example, at original claims 1 and 14, and on page 7, lines 17 through page 8, line 1.

Information Disclosure Statement

Applicants submitted an Information Disclosure Statement and a 1449 Form on December 21, 2001. Applicants respectfully request that initialed copies of the 1449 Forms be returned to Applicants' Representatives with the next official communication to indicate that the cited references have been considered by the Examiner.

§103 Rejection Of The Claims

Claims 1, 3-5, 7, 9-17 and 23 (sic) were rejected under 35 USC §103(a) as being unpatentable over Milewski (U.S. 6,330,967) in combination with "Admitted Prior Art" (APA). It is assumed that claim 27, rather than claim 23, is rejected under this rejection. This rejection is respectfully traversed.

With regard to the rejection of independent claims 1, 11, and 27, the Examiner has the burden under 35 U.S.C. §103 to establish a *prima facie* case of obviousness. Applicants respectfully submit that the Office Action did not make out a *prima facie* case of obviousness for the following reasons: (1) Milewski and APA teach away from Applicants' claims 1, 11, 27, and 39, and (2) Milewski and APA fail to teach or suggest all of the elements of Applicants' claims 1, 11, 27, and 39.

1. Milewski and APA teach away from Applicants' claims 1, 11, 27, and 39.

Motivation to combine or modify the prior art is lacking when the prior art teaches away from the claimed combination. A reference teaches away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path the applicant took. *In re Gurley*, 27 F.3d 551, 31 USPQ 2d 1130, 1131 (Fed. Cir. 1994); *United States v. Adams*, 383 U.S. 39, 52, 148 USPQ 479, 484 (1966); *In re Spinnoble*, 405 F.2d 578, 587, 160 USPQ 237, 244 (C.C.P.A. 1969); *In re Caldwell*, 319 F.2d 254, 256, 138 USPQ 243, 245 (C.C.P.A. 1963).

Claim 1 recites: "...a soldered joint connection between the reflowed solder bump and the electrically conductive material standoff ...".

Claim 11 recites: "...the die having a plurality of...reflowed solder bumps thereon... a soldered joint connection between each of the solder bumps and a respective one of the standoff contact members...".

Claim 27 recites: "...a soldered joint connection between each of the plurality of reflowed solder bumps of the die and respective ones of the plurality of standoff contact members of the substrate..."

Milewski describes "The solder assembly 33 has not yet been reflowed, melted or remelted..." at col. 4, line 63 and "the solder assemblies 33 on the chip 10 are aligned with the corresponding Cu adhesion pads 51... on the ... circuit card 21.... The solder assembly 33, which has not previously been reflowed, is reflowed to form a Pb/Sn eutectic 39 and bond the IC chip 10 to the microelectronic circuit card 21" at col. 5, lines 6-15. The reference teaches away from the claimed combination, because claim 1 recites "...a soldered joint connecting the reflowed solder bump to the electrically conductive material standoff ...", while Milewski clearly states that the solder assembly 33 "is reflowed to form a Pb/Sn eutectic 39 and bond the IC chip 10 to the microelectronic circuit card 21." Because Milewski teaches away from claims 1, 11, and 27, claims 1, 11 and 27 are patentably distinguishable over Milewski and APA.

(2) Milewski and APA fail to teach or suggest all of the elements of Applicants' claims 1, 11, 27, and 39.

Applicants respectfully submit that the Office Action did not make out a *prima facie* case of obviousness, because Milewski and APA fail to teach or suggest all of the elements of Applicants' claims. M.P.E.P. § 2142 (citing *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed.Cir. 1991)).

Claim 1 recites: "a soldered joint connection between the reflowed solder bump and the electrically conductive material standoff."

Claim 27 recites: "...a soldered joint connection between each of the plurality of reflowed solder bumps of the die and respective ones of the plurality of standoff contact members of the substrate..."

Page 3 of the Action states that "Milewski does not appear to explicitly disclose ... that the solder joint is connected to a reflowed solder..." Instead, the Action states that with respect to claim 1, the claim limitations are "process limitations and the prior art structure is the same as the claimed invention." Claims 1 and 27 have been amended accordingly.

Applicants respectfully submit that neither Milewski nor APA teaches, suggests or discloses "a soldered joint connection between ... reflowed solder..." bump(s) as recited in

doesn't claim solder joint of different material

OK

How so?

Does not

How is a reflowed bump distinguished from a bump

that structure at shown 1 bump attached to C

What is 9

why?

claims 1 and 27. Accordingly, claims 1 and 27 are patentably distinguishable over Milewski and APA.

Claim 11 recites: "wherein the solder bumps are plastically deformed,... a soldered joint connection between each of the solder bumps and a respective one of the standoff contact members...".

Neither Milewski nor APA teaches, suggests or discloses "the solder bumps are plastically deformed,... a soldered joint connection between the solder bumps..." as recited in claim 11. Accordingly, claim 11 is patentably distinguishable over Milewski and APA.

New independent claim 39 recites: "...a die with multiple reflowed solder die bumps at a temperature above a melting temperature of solder of the multiple reflowed solder die bumps; a substrate with multiple contact members at a temperature substantially lower than the temperature of the die, wherein the multiple contact members on the substrate have a melting temperature higher than the melting temperature of the solder...".

Neither Milewski nor APA teaches, suggests or discloses the claimed subject matter as recited in new independent claim 39. Accordingly, new independent claim 39 is patentably distinguishable over Milewski and APA.

For the above stated reasons, independent claims 1, 11, 27, and 39 are patentably distinguishable over Milewski and APA.

Dependent Claims

Claims 3-5, 7, 9-10, 12-17, 28-38, and 40-43 depend, directly or indirectly, on claims 1, 11, 27, or 39 and incorporate all of the limitations of the claim(s) from which they depend. Claims 3-5, 7, 9-10, 12-17, 28-38, and 40-43 are also asserted to be allowable for the reasons presented above, and Applicants respectfully request notification of same.

Additional Elements and Limitations

Applicants consider additional elements and limitations of claims 1, 3-5, 7, 9-17, and 27-43 to further distinguish over the cited references, and Applicants reserve the right to present arguments to this effect at a later date.

Conclusion

Applicants respectfully submit that claims 1, 3-5, 7, 9-17, and 27-43 are in condition for allowance, and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicants' attorney, Lucinda Price (located in Gainesville, Florida), at (352) 373-8804, or Applicants' below-named representative (located in Minneapolis, Minnesota) to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

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By their Representatives,

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Date June 1, 2004

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CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: MS Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on this 1st day of June 2004.

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